

**REMARKS**

Reconsideration of the present application is respectfully requested. Claims 1-29 previously presented for examination remain in the application. Claims 1, 12, 19, 21 and 29 have been amended. No new claims have been added and no claims have been canceled.

Claims 12-14, 21 and 29 stand rejected under 35 U.S.C. § 112, second paragraph, as being considered indefinite. In particular, for each of claims 12, 21 and 29, it is stated that the respective limitation that relates to updating the cellular automaton multiple times is inconsistent and ambiguous or unclear. Claims 12, 21 and 29 have been amended as indicated. Applicant respectfully submits that the claims meet the requirements of 35 U.S.C. § 112.

Claims 1-29 stand rejected under 35 U.S.C. § 102(b) as being considered to be anticipated by U.S. Patent No. 5,159,690 to Margolus et al. ("Margolus").

Claim 1 includes the limitations

1. A processor comprising:  
a first memory to store instructions and data for use by the processor, the first memory further to store data representing a first state of a cellular automaton at a first time step, the data to be organized in cells;  
a first update engine; and  
a cellular automaton update unit to provide data from selected cells of the cellular automaton to the first update engine,  
the first update engine to update at least some of the selected cells according to an update rule and a state of any associated neighborhood cells to provide a state of the cellular automaton at a second time step, the first memory, the first update engine and the cellular automaton update unit being integrated on a single chip.

(Claim 1)(emphasis added).

Applicant respectfully submits that Margolus fails to teach or suggest at least a single integrated circuit chip capable of storing and updating data representing a cellular automaton including a memory, an update engine, and a cellular automaton update unit.

Margolus discloses a computer system and approach for coordinating the activity of multiple processors to permute stored data elements and apply transformation rules to permuted elements. (see e.g. Margolus, Abstract). Margolus does not teach or suggest using a single chip to implement the approach and/or apparatus of Margolus. In fact, at column 10, lines 52-57, Margolus describes using 32 chips to implement a cell sub-module alone. For at least this reason, Margolus cannot be considered to teach the claimed elements of applicant's invention including at least a single chip that implements the claimed features as set forth in claim 1.

Margolus also fails to suggest such a chip. Margolus refers to multiple processors and multiple memory chips throughout the disclosure.

Claims 2-10 depend from and further limit claim 1 and thus, should be found to be patentably distinguished over Margolus for at least the same reasons.

Claim 11 includes the following limitations:

a cache memory hierarchy including at least two levels of cache memory, a first level of the cache memory to store data representing a first state of a cellular automaton at a first time step, the data being organized in cells;

an execution cluster including at least a first execution unit to execute microprocessor instructions; and

a cellular automaton update unit, the cellular automaton update unit to provide data associated with cells of the cellular automaton to the first execution unit, the first execution unit to update each cell to be updated in the cellular automaton in response to an update rule and in response to a state of any associated neighborhood cells at the first

time step to provide a second state of the cellular automaton at a second time step.

(Claim 11)(emphasis added).

Applicant respectfully submits that Margolus also fails to teach or suggest at least the claimed first execution unit to execute microprocessor instructions that is also to update cells in a cellular automaton.

As discussed above in reference to claim 1, Margolus uses multiple chips to implement a computing system suited for cellular automata. For at least this reason, Margolus does not teach or suggest a first execution unit to update each cell to be updated in a cellular automaton as set forth in claim 11.

Claims 12-18 depend from and further limit claim 11 and thus, should be found to be patentably distinguished over Margolus for at least the same reasons.

Independent claims 19 and 22 also include limitations relating to using a single general-purpose microprocessor to store and update a cellular automaton. Claims 20-21 and 23-29 depend from and further limit claims 19 and 22, respectively, and thus, are also patentably distinguished over Margolus for similar reasons.

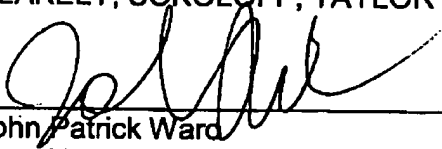
Based on the foregoing, applicants respectfully submit that the applicable rejections have been overcome and that claims 1-29 are in condition for allowance.

If there are any charges due, please charge them to our Deposit Account No.  
02-2666.

Respectfully submitted,

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